

Patent Application of  
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for

**TITLE: Bottle insert for storing and dispensing baby formula**

**CROSS-REFERENCE TO RELATED APPLICATIONS**

Not applicable.

**FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT**

Not applicable.

**SEQUENCE LISTING**

Not applicable.

**BACKGROUND--FIELD OF INVENTION**

This invention relates to infant feeding bottles, and particularly to those of a type used with powdered milk.

**BACKGROUND--DESCRIPTION OF PRIOR ART**

In a commonly used arrangement for bottle-feeding infants, the bottle is filled with water, to which powdered milk is added only when the baby is to be fed. That way, especially during car trips or visits away from home, or on other occasions when refrigeration may not be available for many hours at a time, the baby can be fed

at any time without worrying about whether the milk has spoiled. Many hours can pass between bottle preparation and the feeding of the baby, without requiring refrigeration of the bottle.

When feeding time arrives, the nipple is removed from the bottle, a measured amount of powder is added to the water through the now-open mouth of the bottle, the nipple is reinstalled, and the bottle is shaken to mix the contents.

In such arrangements, the powder is generally stored in a can or in a similar container, often with a measuring spoon or scoop supplied within the same container. The can or other container may be carried, along with one or more water-filled bottles. Just before a feeding, the scoop is used to measure the proper amount of powder to add to the bottle contents.

A can of powdered milk is somewhat heavy and bulky to carry away from home. Accordingly, smaller containers for milk powder have been provided which are washable and refillable. A known design has three chambers, each separately openable and each carrying a measure of powdered milk suitable for a single bottle. However, such a container still must be carried separate and apart from the bottles, and additional inconveniences arise when the number of bottles to be used does not match the number of storage chambers in the container, especially when the number of bottles exceed the number of storage chambers.

In applications where a formula prepared by mixing two constituents has a short shelf-life or where the quantities, quality or sterility of the constituents is an important consideration in the preparation of the formula, a single container which could separately store the two constituents until the mixed formula is to be dispensed, permit the two constituents to be mixed in the container and permit the mixed formula to be dispensed from the container would be useful.

U.S. patent 5,411,155 to Gordon et al. (1995) discloses a protective nipple cover with a chamber for storing a measured

amount of powder for the bottle to be mixed when needed; however, the powder is stored externaly to the bottle. The bottle must be opened to add the powder, thus exposing the contents of the bottle to accidental contamination. It also requires two hands and the caregiver's full attention to add the powder without spilling either the water or the powder.

U.S. patents 6,045,254 to Inbar et al. (1997), 6,575,208 to Igal et al. (2001), and patent application 20010039977 to Igal et al. (2001) all disclose a complex bottle having two chambers, one that can hold water and another that can hold powder. A rotating displaceable partition between the two chambers allows the componets to mix. The two chambers are integral parts of the bottle, requiring the caregiver to purchase the bottle as a unit, made more expensive by the numerous and complex moving parts. This does not allow the caregiver to take advantage of bottles already in their possession. Furthermore, it is designed for pre-packaged single use. The bottle assembly, with its numerous parts and required tolerances, would impede proper washing and extra care would be needed to ensure that all surfaces and crevaces are completely cleansed after each use should the caretaker attempt to reuse the disposable bottle.

Several other types of two chambered bottles have been proposed for seemingly industrial purposes—for example U.S. patent 5,692,644 to Gueret (1995), and patent applications 20020066677 and 20020066679, both (2001)to Moscovitz. Each innvolves a complex bottle or apparatus unsuited to administering infant formula.

Inserts for baby bottles have been proposed for purposes unrelated to storing and releasing infant formula. U.S. patent 4,915,242 to Marte (1989) shows a fixed insert that releases medicines or vitamins at a slow rate into the nipple as the infant nurses on a pre-mixed formula. Marte's insert does not have a sealed chamber to store material; the material constantly communicates with the liquid contents.

U.S. patent 6,041,951 to Blum (2000) shows a fixed insert that

allows the infant to nurse regardless of the bottle orientation. It is not designed for storing and releasing a substance.

Pre-measuring infant powder and water, storing them separately until needed, and the ability to mix the components quickly with a minimum of complexity, handling, attention, chance of contamination or spilling, cleanup, and waste due to single use, while utilizing the bottles, collars, and nipples already in possession, are desirable objectives. None of the above proposals provide an acceptable solution.

#### **BRIEF SUMMARY OF THE INVENTION**

A reusable bottle insert that stores a pre-measured amount of infant formula inside a feeding bottle also having a pre-measured amount of water and allows the powder and water to mix when desired.

The bottle and insert can be prepared ahead of time in anticipation of a later need. This allows the caregiver to prepare the bottle in a more controlled environment, facilitating cleanliness and accurate measurements.

The insert containing the powder resides inside the bottle and releases the powder into the water when a force external to the bottle is applied. This allows the bottle to remain sealed after preparation, ready for mixing, for as long as the sterility of the environment in which it was prepared allows. As it is not necessary to open the bottle to initiate the mixing, a minimum of handling and attention is required from the caregiver, and a significant opportunity for contamination and spilling is eliminated.

The insert is inexpensive due to its compatibility with bottles the caregiver already possesses, its reusability, and its few parts. Its simple operation and lack of moving parts will also facilitate its cleaning.

The bottle insert of the invention fulfills the desired

objectives and provides many advantages not present in the prior art.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

In the drawings, closely related figures have the same number but different alphabetic suffixes. All sections are vertical through the center.

FIG. 1A is an exploded perspective view of a typical prior art feeding bottle, collar, and nipple.

FIG. 1B is a section view of a prior art bottle.

FIG. 1C is a section view of a prior art nipple.

FIG. 1D is a section view of a prior art collar.

FIG. 1E is a section view of a prior art nipple mated to a prior art collar.

FIG. 1F is a section view of a prior art one-piece nipple.

FIG. 1G is a section view of a prior art nipple, collar, and bottle assembly.

FIG. 1H is a section view of a prior art protective nipple cover.

FIG. 1I is a section view of a prior art protective nipple cover mated with a prior art bottle assembly.

FIG. 1J is a detail section view of a prior art protective nipple cover and collar connection.

FIG. 2A shows a one-piece embodiment of the container insert in perspective.

FIG. 2B is a section view of a one-piece container insert.

FIG. 2C is a detail view of a one-piece container insert in perspective.

FIG. 2D is a section view of a one-piece container insert filled with a material.

FIG. 2E is a section view of a one-piece container insert filled with a material and sealed with a nipple-collar assembly.

FIG. 2F is a section view of a one-piece container insert in the storing position.

FIG. 2G is a section view of a one-piece container insert in the releasing position.

FIG. 3A shows an exploded two-piece embodiment of the container insert in perspective.

FIG. 3B is a section view of a two-piece container insert body.

FIG. 3C is a detail view of a two-piece container insert body in perspective.

FIG. 3D is a section view of an assembled two-piece container insert.

FIG. 3E is a detail section view of an assembled two-piece container insert.

FIG. 3F is a section view of a two-piece container insert body mated with a nipple-collar assembly.

FIG. 3G is a section view of a two-piece container insert body mated with a nipple-collar assembly, inverted, and filled with a material.

FIG. 3H is a section view of a two-piece container insert body mated with a nipple-collar assembly, inverted, filled with a material, and sealed with a cap.

FIG. 3I is a section view of a two-piece container insert in the storing position.

FIG. 3J is a section view of a two-piece container insert in the releasing position.

FIG. 4A shows the preferred two-piece container insert, exploded and perspective.

FIG. 4B is a section view of the preferred two-piece container insert body.

FIG. 4C is a detail view of the preferred two-piece container insert body in perspective.

FIG. 4D is a section view of the preferred two-piece container insert assembled.

FIG. 4E is a detail section view of the preferred two-piece container insert assembled.

FIG. 4F is a section view of the preferred two-piece container insert body mated with a nipple-collar assembly.

FIG. 4G is a section view of the preferred two-piece container insert body mated with a nipple-collar assembly, inverted, and filled with a material.

FIG. 4H is a section view of the preferred two-piece container insert body mated with a nipple-collar assembly, inverted, filled with a material, and sealed with a cap.

FIG. 4I is a section view of the preferred two-piece container insert, filled and mated with a nipple-collar assembly, with a protective nipple cover.

FIG. 4J is a section view of the preferred two-piece container insert in the storing position.

FIG. 4K is a section view of the preferred two-piece container

insert in the intermediate releasing position.

FIG. 4L is a section view of the preferred two-piece container insert in the full releasing position.

FIG. 5A shows an exploded three-piece embodiment of the container insert in perspective.

FIG. 5B is a section view of a three-piece container insert body.

FIG. 5C is a detail view of a three-piece container insert body in perspective.

FIG. 5D is a detail view of a three-piece container insert sealing member in perspective.

FIG. 5E is a section view of an assembled three-piece container insert.

FIG. 5F is a detail section view of an assembled three-piece container insert.

FIG. 5G is a section view of partially assembled three-piece container insert filled with a material.

FIG. 5H is a section view of fully assembled three-piece container insert filled with a material.

FIG. 5I is a section view of a three-piece container insert in the storing position.

FIG. 6A is a section view in perspective of a one-piece container insert filled and packaged for immediate use.

FIG. 6B is a section view in perspective of the preferred container insert filled and packaged for immediate use.

FIG. 6C is a section view in perspective of a three-piece container insert filled and packaged for immediate use.



## REFERENCE NUMERALS IN DRAWINGS

### Prior Art Bottle Elements

10 bottle	
11 outer wall	12 closed end
13 open end	14 opening
15 threads	

### Prior Art Nipple Elements

20 nipple	
21 flange	22 neck
23 retaining rib	24 closed end
26 opening	27 cavity
28 perforations	

### Prior Art Collar Elements

30 collar	
31 side	32 end
33 opening	34 threads
35 flange	36 opening
37 retaining rib	

50 nipple-collar assembly	51 one-piece nipple
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### Prior Art Cover Elements

52 cover	
53 open end	54 opening
55 closed end	56 recess
57 side	58 retaining rib

60 bottle assembly

61 liquid	62 material
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### Common Insert Elements

70 graduations	71 packaging
72 castellations	73 rounded corners
74 sealing member	75 pull tab

#### One Piece Insert Elements

100 container insert	
101 outer wall	102 closed end
104 open end	105 opening

#### Two Piece Insert Elements

200 insert body	
201 outer wall	202 open end
203 opening	204 open end
205 opening	208 rib
210 sealing member	
211 side	212 rib
250 container insert assembly	

#### Preferred Insert Elements

300 insert body	301 outer wall
302 open end	303 opening
304 open end	305 opening
308 flange	309 sealing member
310 sealing member	312 side
313 flange	314 groove
315 pushrod	316 bulb
350 container insert assembly	

#### Three Piece Insert Elements

400 insert body	
401 outer wall	403 opening
406 castellations	408 flange
410 sealing member	412 side
413 flange	414 groove
415 fin	416 castellations
450 container insert assembly	

### **DETAILED DESCRIPTION OF THE INVENTION**

For readiest understanding of the invention, it is helpful to describe a prior art feeding bottle in some detail.

Thus, in FIGS. 1A to 1D, the components of a typical prior art bottle assembly **60** are shown, comprising a bottle **10**, a nipple **20**, and a collar **30** (Fig. 1A). Bottle **10** (Fig. 1B) is formed of plastic or glass. Bottle **10** is of hollow construction, with outer wall **11** closed off at closed end **12**, and with an opening **14** at open end **13**. Open end **13** has exterior threads **15**. Nipple **20** (FIG. 1C), formed of silicone or latex, has an outward flange **21**. Nipple **20** has a neck **22** formed by flange **21** and a retaining rib **23**. Nipple **20** has a closed end **24** with a plurality of perforations **28**. Nipple **20** is of hollow construction, forming a cavity **27**. Flange **21** has an opening **26** that allows a liquid (not shown) to be drawn into cavity **27** and out through perforations **28**. Collar **30** (Fig. 1D), which is formed of plastic, has a side **31** with interior threads **34**. Collar **30** has an inward flange **35** with an opening **36**. Collar **30** has an end **32**, with opening **33**. Flange **35** has an outward facing retaining rib **37**.

FIG. 1E shows a section of a nipple **20** mated with a collar **30**, forming a nipple-collar assembly **50**. Closed end **24** is drawn through opening **33** and opening **36**, such that neck **22** is nested in opening **36** and nipple **20** is retained in this position by flange **21** and retaining rib **23**.

FIG. 1F shows a section of a prior art one-piece nipple **51**, which is formed of rubber and plastic in a permanent bond. One-piece nipple **51** may be used in place of a two-piece nipple-collar assembly (not shown).

FIG. 1G shows a bottle **10** mated to a nipple-collar assembly **50**, forming a bottle assembly **60**. Open end **13** is inserted into opening **33**, and threads **15** are engaged with threads **34**. Open end **13** and flange **21**, held together with pressure from flange **35**, form a liquid-proof seal.

FIG. 1H shows a section of an optional prior art cover **52**, which is formed of plastic. Cover **52** has an open end **53** with opening **54**. Cover **52** has a closed end **55**, with a centrally located recess **56** on the interior side. Cover **52** has a side **57** with an

inward retaining rib **58**.

FIG. 1I shows a section of a cover **52** mated to a bottle assembly **60** (see FIG. 1J). Recess **56** conforms to and covers closed end **24**.

FIG. 1J shows the details of retaining a cover **52** on a collar **30**. An inward retaining rib **58** on cover **52** is engaged with an outward retaining rib **37** on collar **30**, forming a snap closure.

A one-piece example of the invention is shown in FIGS. 2A to 2D. A container insert **100** (FIG. 2A) of hollow construction, cylindrical in shape, formed of plastic, preferably transparent, with a plurality of graduations **70** on the outside. Container insert **100** has an outer wall **101** (FIG. 2B), closed off at closed end **102**, with an opening **105** at open end **104**. Outer wall **101** is curved slightly inward at open end **104** (FIGS. 2B and 2C). Outer wall **101** has a plurality of slight castellations **72** with rounded corners **73** along the edge of opening **105** (FIG. 2C). Container insert **100** can be filled with a material **62** through opening **105** (Fig. 2D).

FIGS. 2E to 2G show a one-piece container insert **100** in use. Container insert **100**, filled with a material **62**, is mated with a nipple-collar assembly **50** by inserting open end **104** into opening **26** (FIG. 2E). A liquid-proof seal is created by open end **104** and neck **22**, protecting material **62**. Nipple-collar assembly **50**, with container insert **100** and material **62**, is mated to a bottle **10**, which also contains a liquid **61** (FIG. 2F). This is the storage position for container insert **100**. Liquid **61** and material **62** cannot communicate and may be stored separately in this configuration, ready for mixing, for as long as the sterility of the environment in which it was prepared allows. When mixing is desired, nipple **20** is depressed with enough force to dislodge container insert **100** from nipple **20** (FIG. 2G). Open end **104** is unsealed, allowing material **62** and liquid **61** to mix through opening **105**. After agitating bottle assembly **60** the mixture can be administered.

A two-piece example of the invention is shown in FIGS. 3A to 3E. A container insert assembly **250** (FIG. 3A), comprising an insert body **200** of hollow construction, cylindrical in shape, formed of plastic, preferably transparent, with a plurality of graduations **70** on the outside, and a sealing member **210** shaped like a cap. Insert body **200** has an outer wall **201** (FIG. 3B), with an opening **203** at open end **202** and an opening **205** at open end **204**. Outer wall **201** is curved slightly inward at open end **204** (FIGS. 3B and 3C). Outer wall **201** has a plurality of slight castellations **72** with rounded corners **73** along the edge of opening **205** (FIG. 3C). Sealing member **210** is attached to insert body **200** at open end **202** (FIG. 3D). Sealing member **210** has a side **211** (FIG. 3E) with an inward rib **212**, which engages with an outward rib **208** on outer wall **201** at open end **202**, forming a removable liquid proof snap closure.

FIGS. 3F to 3J show a two-piece container insert assembly **250** in use. An insert body **200** is mated with a nipple-collar assembly **50** by inserting open end **204** into opening **26** (FIG. 3F), forming a liquid-proof seal between open end **204** and neck **22**. Insert body **200** and nipple-collar assembly **50** are inverted, and a material **62** is added through opening **203** (Fig. 3G). A sealing member **210** is attached to insert body **200** at open end **202**, forming a container insert assembly **250** (FIG. 3H), and with nipple-collar assembly **50** material **62** is sealed. Nipple-collar assembly **50**, with container insert assembly **250** and material **62**, is mated to a bottle **10**, which also contains a liquid **61** (Fig. 3I). This is the storage position for container insert assembly **250**. Liquid **61** and material **62** cannot communicate and may be stored separately in this configuration, ready for mixing, for as long as the sterility of the environment in which it was prepared allows. When mixing is desired, nipple **20** is depressed with enough force to dislodge container insert assembly **250** from nipple **20** (FIG. 3J). Open end **204** is unsealed, allowing material **62** and liquid **61** to mix through opening **205**. After agitating bottle assembly **60** the mixture can be administered.

The preferred embodiment of the invention is shown in FIGS. 4A to 4E. A container insert assembly **350** (FIG. 4A), comprising an insert body **300** of hollow construction, cylindrical in shape, formed of plastic, preferably transparent, with a plurality of graduations **70** on the outside, and a sealing member **310** shaped like a cap with a pushrod **301** in the inside center. Insert body **300** has an outer wall **305** (FIG. 4B), with an opening **303** at open end **302** and an opening **304** (FIGS. 4B and 4C). Outer wall **301** is curved slightly inward at open end **304** (FIGS. 4B and 4C). Sealing member **310** is attached to insert body **300** on its end, is long enough to protrude from opening **305**. Outer wall **301** has a flange **302** (FIG. 4D). Pushrod **315**, with a bulb **316** on its end, is long enough to protrude from opening **305**. Outer wall **301** has a flange **302** (FIG. 4E), which seats in a groove **314** on sealing member **310**, formed by a side **312** and a flange **313**, providing a liquid-proof seal.

FIGS. 4F to 4L show a container insert assembly **350** in use. An insert body **300** is mated with a nipple-collar assembly **50** by inserting open end **304** into opening **26** (FIG. 4F), forming a liquid-proof seal between by open end **304** and neck **22**. Insert body **300** and nipple-collar assembly **50** are inverted, and a material **62** is added through opening **303** (Fig. 4G). A sealing member **310** is attached to insert body **300** at open end **302**, pushing pushrod **315** through material **62**, forming a container insert assembly **350** (FIG. 4H), and with nipple-collar assembly **50**, closed end **24**, when slightly compressed by recess **56**, should not come in contact with pushrod **315**. Nipple-collar assembly **50**, with container insert assembly **350** and material **62**, is mated to a bottle **10**, which also contains a liquid **61** (Fig. 4J). This is the storage position for container insert assembly **350**. Liquid **61** and material **62** cannot communicate and may be stored separately in this configuration, ready for mixing, for as long as the sterility of the environment in which it was prepared allows. When mixing is desired, closed

end **24** of nipple **20** is depressed (Fig. 4K), exerting enough force on pushrod **315** to dislodge sealing member **310** from insert body **300**. Open end **302** is unsealed, and material **62** and liquid **61** can mix through opening **303**. Nipple **20** is depressed further to dislodge insert body **300** from nipple **20** (FIG. 4L). Open end **304** is also unsealed, allowing material **62** and liquid **61** to mix through both opening **305** and opening **303**, facilitating a thorough mixing. After agitating bottle assembly **60** the mixture can be administered.

A three-piece example of the invention is shown in FIGS. 5A to 5F. A container insert assembly **450** (FIG. 5A), comprising an insert body **400** of hollow construction, cylindrical in shape, formed of plastic, preferably transparent, with a plurality of graduations **70** on the outside, and two sealing members **410** shaped like caps. Insert body **400** has an outer wall **401** (FIG. 5B) with an opening **403** at each end. Outer wall **401** has a plurality of slight castellations **406** along the edge of each opening **403** (FIG. 5C). Each sealing member **410** has a side **412** with a plurality of slight castellations **416** (Fig. 5D). Sealing members **410** are attached to insert body **400** at each end (FIG. 5E). Outer wall **401** has a flange **408** at both ends, each which seats in a groove **414** on a sealing member **410** (FIG. 5F), formed by side **412** and a flange **413**, providing a liquid-proof seal. Each sealing member **410** has a fin **415** on the outside.

FIGS. 5G to 5J show the three-piece container insert assembly **450** in use. An insert body **400** is mated with a sealing member **410** at one end, and filled with a material **62** through the other (Fig. 5G). A second sealing member **410** is mated to the open end of insert body **400**, forming a container insert assembly **450** (FIG. 5H) and sealing material **62**. Container insert assembly **450**, with material **62**, is placed inside a bottle assembly **60**, which also contains a liquid **61** (Fig. 5I). This is the storage position for container insert assembly **450**. Liquid **61** and material **62** cannot communicate and may be stored separately in this configuration, ready for mixing, for as long as the sterility of the environment



in which it was prepared allows. When mixing is desired, bottle assembly **60** is shaken with enough force to dislodge each sealing member **410** from insert body **400** (FIG. 5J). The ends of insert body **400** are unsealed, allowing material **62** and liquid **61** to mix through both openings **403**. After agitating bottle assembly **60** mixture can be administered.

The container inserts can also be prepackaged for immediate use. FIG. 6A shows a container insert **100**, filled with a material **62**, with open end **104** sealed using a sealing member **74**, and enclosed in a packaging **71**. Sealing member **74** can be a cellophane diaphragm held in place using a non-permanent adhesive or heat bond such that sealing member **74** can be easily removed using a pull tab **75**. Packaging **71** can be a foil wrapper. FIG. 6B shows a container insert assembly **350**, filled with a material **62**, with open end **304** sealed using a sealing member **309**, and enclosed in a packaging **71**. Sealing member **309**, made of a suitable rigid plastic, is held in place by friction against outer wall **301**, prevents an accidental force on pushrod **315** that might dislodge sealing member **310**, and can easily be removed. FIG. 6C shows a container insert assembly **450**, filled with a material **62**, and enclosed in a packaging **71**.

Accordingly, the reader will see that the container insert of this invention can be used to store a material separately inside a bottle, and release the material into the bottle when desired. Furthermore, the container insert has the additional advantages in that:

- it permits the caregiver to prepare the bottle in a controlled environment, facilitating cleanliness and accurate measurements;
- it permits the caregiver to mix the contents when desired without reopening the bottle, eliminating a significant chance of contamination;
- it permits the caregiver to mix the contents quickly and with minimal attention, even one handed with tactile senses only;
- its simple design allows ease of cleaning;
- it works with bottles the caregiver already possesses.



Although the description above contains many specificities, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the presently preferred embodiments of the invention. For example, the container insert body can be made of a bag to work with prior art bag-style bottles; the container insert can be used in bottles other than for feeding infants, including geriatric, invalid, and livestock care; the insert container can be shaped differently to accomodate different bottles.

Thus the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the examples given.